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CALENDAR

OF THE

Kingston School of Mining and Agriculture,

KINGSTON, ONTARIO.

SESSION 1893-94.

KINGSTON:

PRINTED BY WM. BAILIE.

1893.

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1893/94

CALENDAR.

1893.

October 9—Classes open.
“ 16—Holiday.
December 22—Christmas Holidays begin.

1894.

January 9—Classes re-open.
February 7—Holiday.
March 23—Holiday.
April 6—Class work closes.
“ 9—Examinations begin.
“ 25—Convocation for distributing prizes, announcing
honours, and laureating graduates.

VISITOR.

His Honour GEORGE A. KIRKPATRICK, D.C.L., LL.D., &c.,
Lieutenant-Governor of Ontario.

Chairman of the Board of Governors, J. B. CARRUTHERS, Esq.

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FACULTY.

WM. L. GOODWIN, B.Sc. (LOND.), D.Sc. (EDIN.), F.R.S.C., Professor of Chemistry.	
WILLIAM NICOL, M.A., Professor of Mineralogy, Metallurgy and Assaying.	
WILLET G. MILLER, B.A., Lecturer on Geology and Petrography.	
WM. HAMILTON MERRITT, M.E., F.G.S., Associate Royal School of Mines, England, Lecturer on The Economic Geology of Ontario and the Discovery and Winning of Minerals.	
R. CARR HARRIS, C.E., Professor of Engineering.	
WILLIAM MASON, Lecturer on Freehand, Mechanical and Office Drawing, Topography and Sur- veying.	
T. L. WALKER, M.A., DR. ISAAC WOOD, M.A.,	} Laboratory Demonstrators.

GENERAL ANNOUNCEMENTS.

The School of Mining and Agriculture is incorporated by Act of the Legislature of Ontario.

The objects of the school are, to give a complete scientific education of both a theoretical and a practical character to young men studying for metallurgists or mining engineers; to give practical instruction to prospectors, mine foremen, and others interested in the discovery and winning of minerals; to lead prospecting excursions of the students as well as of those more directly interested in the development of mineral lands; and to provide theoretical and practical instruction in subjects pertaining to modern agriculture, such as dairying, veterinary science, and the chemistry, botany, and zoology of the farm.

THE SCHOOL OF MINING.

REGISTRATION.—All students are required to register at the beginning of each session.

OCCASIONAL STUDENTS.—Unmatriculated students may take any classes and examinations that they wish, as it is desired to give opportunities to persons who do not intend to follow engineering as a profession to receive the benefit of courses likely to be useful in common life.

MATRICULATION.—Candidates for a degree must pass the matriculation examination before being admitted to examination on the work of the course. Matriculation consists of the usual matriculation examination for Ontario in the subjects of (1) English, (2) Mathematics, (3) Chemistry, (4) Physics, (5) Latin, or French, or German. The details of this examination may be found in the Calendars of Ontario Universities. Departmental certificates of matriculation are accepted. Other matriculation examinations will be accepted so far as they are equivalent. Candidates who have made at least fifty per cent on the honour papers in any of the matriculation subjects are not required to take the junior class in that subject.

A course for a degree in Assaying and Analytical Chemistry (A.C.) is under consideration.

DEGREE.—The degree of Mining Engineer (M. E.) will be conferred on those who take the course specified hereafter and pass the required examination. Examinations of other schools will be accepted *pro tanto*.

FEES.—Registration, Class and Laboratory fees must be paid annually on or before October 16.

Registration.....	\$ 1 00
For the Course in Mining: first year.....	40 00
" " second "	50 00
" " third "	55 00
" " fourth "	55 00
Any full Course of Lectures taken singly.....	12 00
Any Laboratory Course taken singly.....	20 00
Analytical Chemistry (Medical).....	12 00
Specialists' Practical Course in Qualitative Analysis, Blowpiping and Mineralogy.....	10 00
Elementary Mineralogy and Blowpiping.....	3 00
Graduation Fee.....	20 00
Annual Examination Fee.....	3 00

COURSE OF STUDY.—The course extends over four years and includes the following subjects :—

Junior English, or Junior French, or Junior German, or Junior Latin, Junior Mathematics, Modern Geometry, Higher Algebra, Solid Geometry, Plane Co-ordinate Geometry (1st course), Plane and Spherical Trigonometry, Differential and Integral Calculus (1st course), Junior and Senior Physics, Optics, Junior and Senior Chemistry (with Laboratory Practice), Qualitative and Quantitative Analysis, Blowpipe Analysis, Assaying, Mineralogy, Crystallography, Geology, Petrography, Ore Deposits, Mining, Ore Dressing, Metallurgy, Drawing and Designing, Materials and Construction, Surveying, Principles of Mechanism, Astronomy, and Civil Engineering, (Elementary).

The following order of classes is advised :—

First Year.

Junior English, or Junior French, or German, or Latin, Junior Mathematics, Junior Physics, Junior Chemistry, Blowpipe Analysis, Drawing.

Second Year.

Senior Physics, Modern Geometry, Solid Geometry, Plane and Spherical Trigonometry, Senior Chemistry, Qualitative Analysis, Mineralogy II, Crystallography, Drawing and Designing.

Third Year.

Co-ordinate Geometry, Higher Algebra, Calculus, Optics, Astronomy, Geology, Petrography, Mineralogy III, Qualitative Analysis, Simple Quantitative Analysis, Materials and Construction, Mining Engineering.

Fourth Year.

Geology, Ore Deposits, Assaying, Mining, Ore Dressing, Metallurgy, Mechanism, Engineering, Surveying, Quantitative Analysis.

SUBJECTS OF STUDY.—The courses in English, French, German, Latin, Junior Mathematics, and Junior Physics are to be followed as found in Queen's University Calendar. In addition to the class of Senior Physics, students will be examined on :

Dupuis' Geometrical Optics, and Lloyd's Wave Theory of Light.

ADVANCED CLASSES IN MATHEMATICS.

Synthetic Modern Geometry.

Mondays at 4 P. M.

Dupuis' Synthetic Geometry, Pts. III, IV, V.

Higher Algebra, including Elementary Determinants.

Tuesdays at 4 P. M.

Hall and Knight's Higher Algebra.

Synthetic Solid Geometry.

Thursdays at 4 P. M.

Plane Co-ordinate Geometry.

Mondays at 11 A. M.

C. Smith's Conics.

Differential and Integral Calculus.

Thursdays at 11 A. M.

Edward's Differential Calculus.

Trigonometry, Plane and Spherical.

Tuesdays at 11 A.M.

Lock's Trigonometries, Elementary and Higher.

CHEMISTRY.

Professor: William L. Goodwin, D.Sc., Edin.

Demonstrators: T. L. Walker, M.A., and I. Wood, M.A., M.D.

JUNIOR.

Chemical Species—Crystals and Crystallisation—Chemical Change—Laws of Combination—Relations of Heat to Chemical Changes—Notation—Equations—Nomenclature—Volume relations of gases in Chemical Change—Volume Formulas—The Atomic Theory—Descriptive Chemistry of the more common elements and compounds—Electrolysis—Spectrum Analysis—Laboratory Practice.

Books : Goodwin's Chemistry (Henderson & Co., Kingston).

Mixter's Elementary Chemistry (Wiley & Sons).

Remsen's Inorganic Chemistry (Advanced Course).

SENIOR.

1. Chemical Laws and Theories.
2. Metals, their occurrence in nature, reduction and uses.
3. Crystallography.
4. Qualitative Analysis (Practical).

Books : Dobbin & Walker's Chemical Theory (Macmillan & Co.)
 Goodwin's Chemistry (Supplement) Henderson & Co.)
 Richter's Inorganic Chemistry (P. Blakiston, Son & Co.)
 Williams' Crystallography (Henry Holt & Co.)
 Thorpe & Muir's Qualitative Analysis (Longman's,
 Green & Co.)

Third Year.

Chemistry of Fuel, Ores, Fluxes, &c.

Monday at 3 P.M.

Qualitative Analysis.

Tuesday at 3 P.M.

Wednesday 2-4 P.M.

Friday at 2 P.M.

Qualitative Analysis of Minerals, &c.

Simple Quantitative Analysis.

Books : Roberts-Austen's Metallurgy (Griffin & Co.)

Fresenius' Qualitative Analysis.

Hartley's Quantitative Analysis (Macmillan & Co.)

Fourth Year.

Quantitative Analysis.

Monday and Tuesday at 2 P.M.

Wednesday 2-4 P.M.

Books : Fresenius' Quantitative Analysis.

Leffman & Beam's Water Analysis.

ASSAYING.

Friday 2-5 P.M.

The Assaying of gold, silver, copper, lead, zinc, iron and nickel ores, by furnace and wet methods.

Text-book—Brown's Manual of Assaying, 4th Ed. (Sargent & Co. Chicago).

Books for reference :

Fresenius' Quantitative Analysis.

Blair's Analysis of Iron.

Bodemann & Kerl's Assaying.

GEOLOGY.

Lecturer: Willet G. Miller, B.A.

Third Year.

Lithological Geology and Petrography, Classification of Rocks.

Dynamical Geology.

Outline of the Geological History of the Globe, with special reference to the formations found in Canada.

Physical Geography, Geology and Palæontology.

Examination and Determination of Rocks and Fossils.

Method of preparing rock sections for the microscope, and examination of prepared sections.

Books for reference :

Page's or Geikie's Physical Geography.

Lyell's Principles of Geology.

Dana's Manual of Geology.

Fourth Year.

Examination of specimens of Rocks, Minerals, &c.

A special study of Canadian Geology.

Economic Minerals of Canada.

Field Geology.

Ore Deposits.

Books for reference :

Geikie's Field Geology.

Chapman's Mineralogy and Geology of Canada.

Dawson's Handbook of Canadian Geology.

Phillips' Ore Deposits.

MINERALOGY.

Professor: William Nicol, M.A.

First Year.

Blowpipe Analysis—(a) A course of practical demonstrations to illustrate and explain reactions in studying the chemical properties of Minerals (one hour per week). (b) A Practical class in which the experiments seen in the lectures are performed by the students (one hour per week).

Text-Book—Chapman's Blowpipe Practice.

Books for reference—Cornwall's Translation of Plattner's Manual of Qualitative and Quantitative Analysis with the Blowpipe. Landauer's Blowpipe Analysis.

Students must supply their own blowpipe apparatus.

Second Year.

1. Systematic Mineralogy.
Monday at 2 P.M.

Text-book—Bauerman's Systematic Mineralogy (Longmans, Green & Co.)

Books for reference—Naumann-Zirkel's Mineralogie.
Tschermak's Mineralogie.

2. Crystallography.

Lectures and practical study of crystal forms by means of natural crystals and wooden and wire models.
Williams' Crystallography (Henry Holt & Co.)

3. Qualitative analysis of minerals by blowpipe and wet reagents.

Third Year.

1. Descriptive Mineralogy.
Thursday at 2 P.M.

Description and classification of the commonly occurring minerals, special attention being given to Canadian Ores.

Text-book—Bauerman's Descriptive Mineralogy (Longmans, Green & Co.)

Books for reference :

Chester's Catalogue of Minerals.
Chapman's Minerals and Geology of Ontario and Quebec,
3rd ed. (Copp, Clark Co.)
Dana's System of Mineralogy.
Commissioner's Report on Mineral Resources of Ontario,
1890.
Reports of Bureau of Mines, 1891-92.

2. Determinative Mineralogy.
Monday at 3 P.M.

Practical instruction in the determination of minerals by means of the blowpipe and by field tests, such as color, hardness, streak, &c.

Text-book—Frazer's Tables for the determination of minerals,
3rd ed., 1891, (J. B. Lippincott & Co., Phila.)

3. Quantitative Analysis of Minerals (selected samples).

MINING ENGINEERING AND ORE DRESSING.

Lecturer : Wm. Hamilton Merritt, F.G.S.

Mining.

Excavation, explosives, drilling, blasting, prospecting, shaft sinking, drifting, exploitation, underground transportation, hoisting, drainage, ventilation, lighting, accidents, mine accounts, and mine surveying.

Ore dressing.

Physical properties upon which ore dressing operations are based.

Theory of jigging, and slime treatment.

Hand dressing.

Crushing-machinery; jaw crushers, stamps, rolls, pulverizers, etc.

Sizing-machinery; flat and revolving screens, tables, etc.

Typical ore dressing works.

METALLURGY.

Professor : William Nicol, M.A.

Ores, furnaces, fuel; the metallurgy of iron, steel, nickel, silver, gold, copper, lead, and aluminum.

DRAWING.

Lecturer : Wm. Mason.

First Year.

Drawing instruments and materials; descriptive geometry; projection; tinting and lettering; topographical drawing.

Second Year.

Machine sketching; graphical statics; designing.

MATERIALS AND CONSTRUCTION.

Professor : R. Carr Harris, C.E.

Applied statics; testing of materials; properties of materials; designing and execution of engineering structures.

MECHANISM.

Laws of motion; linkwork, &c.; problems in applied mechanics; engineering appliances: the steam engine; steam pumps, &c.

SURVEYING.

Lecturer : Wm. Mason.

Plane, topographical, and railroad surveying; calculations; maps and scales; topographical drawing; use and adjustment of surveying instruments; methods of surveying; field work; mine surveying.

